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ABSTRACT

Over the past two decades, national enrollment projection studies have experienced an uneven level of success in the accuracy of their predictions. An awareness of the limitation of existing projection techniques has been heightened by the growing realization hat existing definitions of enrollment are inadequate. This article examines the best known national enrollment studies in terms of methodologies, objectives and assumptions. Directions for developing new approaches are suggested. (MJM)

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National Enrollment Projection Studies

Over the past two decades, national enrollment projection studies have experienced an uneven level of success in the accuracy of their predictions. An awareness of the limitations of existing projection techniques has been heightened by the growing realization that existing definitions of enrollment are inadequate. The article that follows examines the best known national enrollment studies in terms of methodologies, objectives and assumptions. The authors, Wayne L. Mangelson, Donald M. Norris, Nick L. Poulton, and John A. Seeley, also suggest directions for developing new approaches in this critical field. Mangelson is director of educational development, Michigan Municipal League. Norris is a Rackham predoctoral fellow at The University of Michigan. Poulton serves as research associate in the office of academic planning and analysis at the University of Michigan. Seeley is a partner in the Formative Evaluation Research Associates. All four are Ph.D. candidates at The Center for the Study of Higher Education, The University of Michigan.

The projection studies of the sixties were based on enrollment trends of the fifties and *underestimated* consistently the actual enrollments of the period. On the other hand, the projection studies of the early seventies have been grounded in the enrollment trends of the late sixties and have *overestimated* the actual enrollments that have occurred. In recent years, as many institutions have been confronted with leveling or declining enrollments and with the concommitant need to plan, the inaccuracies and shortcomings of national enrollment studies have come into sharper focus.

The expanded notion of postsecondary education, non-traditional studies, increasing numbers of adult learners, and a host of other factors have led many educators to call for a basic redefinition of what measures should be used to gauge participation in postsecondary education. Periodic national measurement and projection studies are potentially a major forum for addressing these issues. Projection studies are especially important in this sense. By using new definitions as the basis for enrollment projection, these studies may effect perceptions of the future of postsecondary education, based on the new conceptions of what constitutes enrollment.

Educators have come to realize that enrollment projection studies involve important educational decisions. These basic decisions relate both to the use of the numerical outputs of projection studies and to the input decisions that determine the characteristics of the numerical outputs. Our analysis of existing studies reveals that the major shortcomings of existing projection techniques involve these input decisions. Moreover, these shortcomings involve not only methodological considerations, but relate primarily to the basic conceptual issues of the strategies, purposes, and assumptions of projection studies. Therefore, the planner in higher education must be able to analyze and utilize national enrollment projection studies on the basis not only of the nature of their numerical outputs, but also of their conceptual strengths and weaknesses.

Analyzing Present Enrollment Projections

A number of key questions are posed by educational planners and decision makers when confronted with an enrollment projection: Can one identify the elements included in an enrollment projection? Can the projection be related to a particular setting? Does the nature of the projection facilitate planning decisions? Are important indicators identified which can be used to monitor the future validity of the projection? Unfortunately, each enrollment projection utilizes differing objectives and methodologies, and details are seldom fully described. Consequently, these questions are not easily answered. The following discussion focuses on a number of national enrollment projection studies. Examining the nature of the input decisions and the outputs of these studies provides a framework for the educational planner in analyzing enrollment projections.

Figure 1

PROJECTIONS OF TOTAL ENROLLMENTS

1965 - 2000

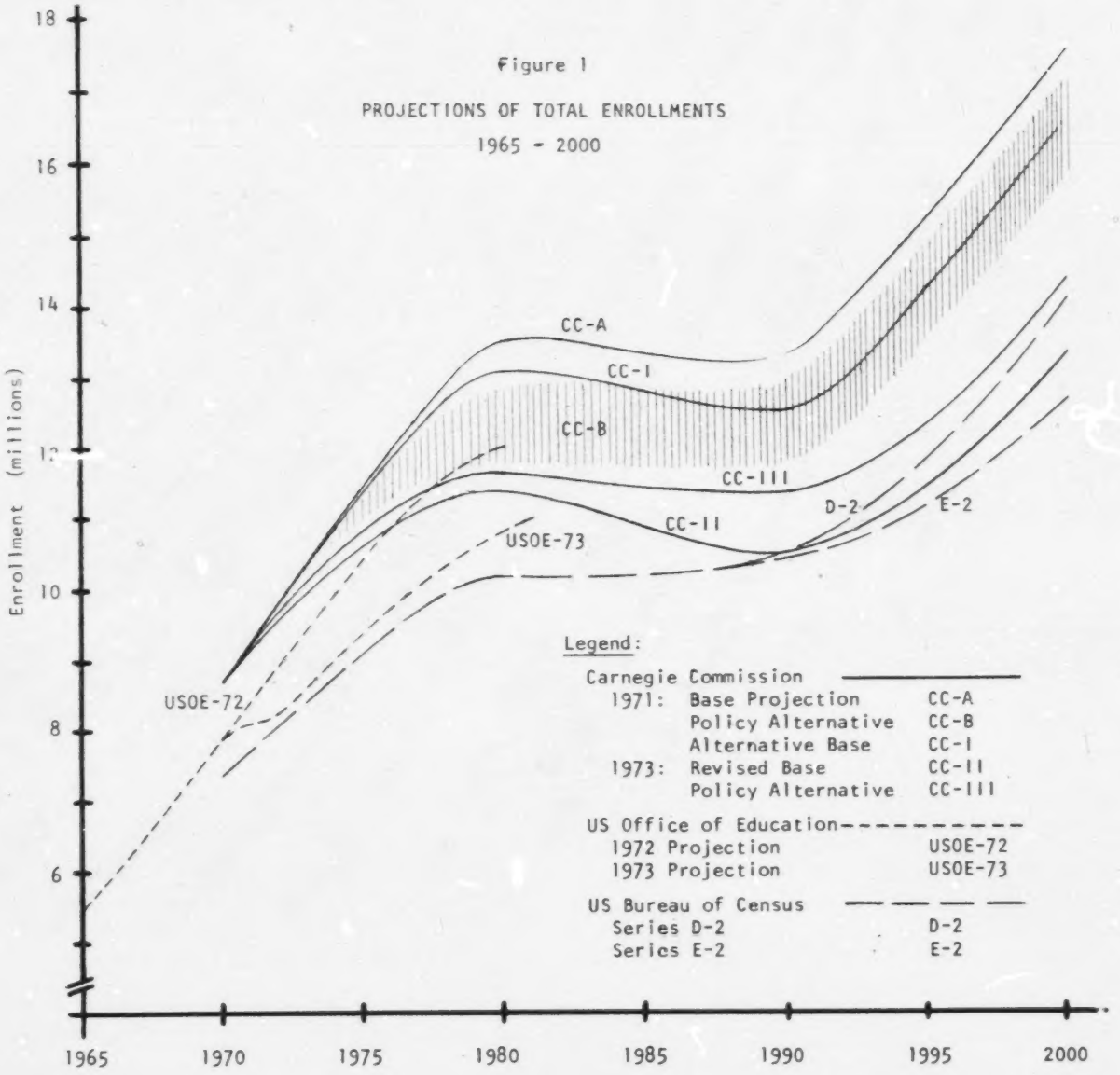

Figure 1 portrays the numerical outcomes of a number of recent projection studies. The shape of the curves reveals a story familiar to the planner: Projected growth through the seventies, followed by a plateau through the eighties, and then continued growth into the nineties. Although each projection displays this general shape, significant variations exist between the projections of the U.S. Census (8), the U.S. Office of Education (9a, 9b), and the Carnegie Commission (2a, 2b). Actually, strict comparability between these various enrollment studies may not be possible, for it is not clear in each case how "total enrollment" is defined. The inclusion of non-degree credit enrollment in the Carnegie projections may account for the higher enrollments projected by these studies. Consequently, it is prudent to compare the studies of different agencies only in relation to the general shape of their projection curves. This comparison provides further verification of the current state of uncertainty existent in enrollment projection studies.

A comparison of different projections by the same agency results in further insights. For example, comparing two recent USOE projections demonstrates how extrapolative projections may be slow to react to

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changing trends. Significant declines in the rate of enrollment growth in 1972 and 1973 cause a "dip" in the most recent curve. However, the projection soon begins to parallel closely the earlier curve, because USOE uses 10-year trends as a basis to project enrollments 10 years into the future. Even using statistical techniques which magnify the impact of events in recent years, extrapolative techniques require a number of years of changing trends before they adequately reflect the character of the change. By that time, many knowledgeable observors have already reacted to changing conditions.

The projections of the Carnegie Commission demonstrate how the implications of policy alternatives, the effects of changing conditions, or a combination of these factors can influence enrollment studies. Projections CC-A and CC-I are base projections which the Carnegie Commission generated in 1971. By making policy recommendations, assessing their impact on projection, and applying these impacts to projection CC-A, the Commission generated an enrollment "envelope" portrayed by the shaded area CC-B. By 1973, however, changing conditions required a reassessment, and a new base projection CC-II was created. Projected enrollments for 1980-2000 were reduced by at least 10-20% from the previous base. Recently, the Commission combined its assessment of the effects of changing conditions with the implied impacts of its recommendations contained in *Toward the Learning Society* to produce projection CC-III.

The variability in the outcomes of enrollment projections is caused by variations in the structural characteristics of different projections. The characteristics of eight recent projection studies are summarized in Figure 2. The general characteristics most important for understanding current enrollment projections are the type of methodology or *strategy* employed, the basic *purpose* or intended use of a particular projection, and the underlying *assumptions* embodied in a study.

I. Projection Strategy

As **Table I** reveals, *trend analysis* using various extrapolative techniques is the most common methodology employed in making enrollment projections. However, two developments of recent years have enlarged the spectrum of projection strategies. Extrapolative techniques have been combined with alternative sets of policy assumptions to produce a category labeled *policy alternatives*. In addition, the growth of a body of *futurist* literature has provided a third perspective from which to generate projections of enrollments.

- **Trend extrapolation** requires a base time period in the past from which to project incrementally from year to year into the future. Generally, enrollments are not projected directly, but indirectly through the extrapolation of enrollment ratios which are usually apolied to cohort groups of population projections. The projections of the U.S. Census and the U.S. Office of Education utilize extrapolative techniques.

- **Policy alternative** approaches are distinguished by a set of projections, each of which is the result of a different combination of assumptions relating to decisions made either by an institution or by some external constituency of the institution. Although it is possible through simple parameter manipulation to provide a range of different extrapolated projections, the policy alternative approach goes one step further by relating different policy decisions directly to ensuing enrollment projections. The Carnegie Commission's projections are examples of the policy alternative approach, in contrast to the early Cartter-Farrell work (3), which did not link alternative projections directly to specific sets of educational policy assumptions. The Carnegie Commission report, *New Students and New Places,* is a recent example of a basic enrollment projection accompanied by a set of policy recommendations, each of which would incrementally adjust the basic projection toward a desired goal.

- **Futurist approaches** are only beginning to develop and as yet have not produced the characteristically tangible, numerical results associated with the other two techniques. This strategy depicts the future through construction of scenarios which are descriptions of the future states of interdependent factors which influence society. A range of widely differing scenarios, called alternative futures, may be used as a means of illustrating the effects of many interconnected alternatives and decisions and their impact upon the long-term future of education.

Unfortunately, the futurist approach requires estimates of the future states of various key factors. Prediction of those future states with an acceptable degree of confidence is difficult indeed. Furthermore, linkages are not easily demonstrated between long-term scenarios and the near-term future. Therefore, futurist approaches have not yet achieved wide acceptance, and important long-range implications of current decisions may be overlooked. Moreover, potential insights are lost that would be gained from projecting alternative futures back to current situations and decisions.

Three particular studies incorporate variations of the futurist approach. They differ considerably in the type of results produced. The RAND study (1) employs a scenario technique to describe alternative future settings, but continues to use extrapolation and policy alternatives for generating output data. The Moses study (7) produces very general output figures across a greatly expanded view of learning activities, but does not describe the techniques employed in producing that data. The Marien study (6) develops an extensive set of six alternative scenarios, but does not attempt to project actual enrollment data. This truly futurist strategy needs to be extended to include more specific linkages to education which might be useful for developing enrollment projections.

II. Objectives of Projections

The intended purpose of an enrollment projection determines in most cases the definitions of quantities used, many of the assumptions made, the types of output categories projected, and to some degree the methodological approach used. It is important to recognize the bias emanating from the intended purpose of any enrollment projection. The studies described in Figure 2 have a range of objectives: the development of demographic descriptions, manpower supply forecasts, planning data, future resource requirements, level of latent educational demand and policy recommendations.

Most of these studies use population data as the primary driving factors and rely to some degree on extrapolation for the projection methodology. However, the latent demand or aspirational focus of the model developed by the Office of Program Planning and Evaluation (5) utilizes high school graduates as the main input and uses an entirely different technique for projecting the output data.

Those studies intended for near-term future planning purposes tend to have single projections and produce a larger number of specific output categories. The longer-term studies tend to provide alternative projections usually reflecting the anticipated extremes of enrollment. The regular reports of the U.S. Bureau of the Census and the U.S. Office of Education reflect the functions of government agencies to provide updated information. However, the differing objectives of those two agencies accounts for the wide variation in the degree of disaggregation in the output data. The U.S. Census is interested primarily in demographic description and has little disaggregation in its output. This contrasts to the attempt of the USOE to provide much more detailed information for planning in education.

III. Underlying Assumptions

Another view of the differences between enrollment projections is found when considering the underlying assumptions incorporated into a projection. In many respects this aspect relates very closely to the strategy and purpose of a projection. But often many of the underlying assumptions do not surface until operational issues or methodologies are scrutinized. The wide differences between these assumptions considerably limit the comparability of enrollment studies and bring into question their applicability to the current postsecondary education scene.

It is convenient to classify assumptions into two areas, those relating to the input factors included in a projection, and those relating to the methodological techniques which generate the output data. Basic educational decisions which often elude the investigator or reader are involved in making these assumptions. Our investigation of projection studies provides the following conclusions:

- The assumptions underlying the inputs to existing enrollment studies have been inadequate for projecting college enrollments:
  1. The common usage of only the 18-21-year-old age cohort as the basis for projection is misleading. Broader cohort populations must be utilized in order to reflect the extension of the time period of the education process and the participation of older learners.
  2. Although it is necessary to utilize birth rate assumptions in predicting the size of traditional college cohort populations beyond 1990, it must be recognized that birth rate trends are currently in a state of flux.
  3. Most projection studies assume implicitly that the underlying socio-economic factors which influence aspirations for education have not changed. Such assumptions seem unlikely.
  4. Projection studies have assumed that the institutional composition of higher education will not change. The emergence of the notion of postsecondary education suggests that different institutional forms and enrollment patterns should be considered for the future.
- Assumptions that are inherent to a particular methodological technique are not fully recognized or described in most projection studies, thereby making interpretation of the outcomes very difficult:
  1. The use of extrapolation assumes that the future will reflect the past along certain important dimensions. To be confident of the results of extrapolation, the factors selected for extrapolation must be appropriate, and trend relationships must be understood. It seems apparent that we need to reconsider the factors currently used for extrapolation and the trend relationships which we have assumed to be operative. In addition to influencing the quality of the extrapolation, the parameter or model element selected for extrapolation largely determines the utility of the projection outcome for specific planning purposes.
  2. Many projection studies that suggest policy alternatives do not develop fully the linkage between those policy alternatives and the resulting enrollment figures.
  3. The futurist approach is primarily limited to a long-term horizon and consequently has not yet been able to translate those long-range alternatives into short-term projections. Futurist outlooks are most valuable for policy level decisions rather than for managerial or operational level decisions.
- By extrapolating cohort attendance ratios or enrollments rather than the underlying factors actually influencing enrollments, existing projections fail to incorporate mechanisms for explaining *why* enrollments are changing. Therefore, existing studies are unable to predict when and if further changes in enrollment *trends* will occur.

TABLE I

DESCRIPTIVE ANALYSIS OF NATIONAL ENROLLMENT PROJECTIONS

Characteristics	U.S. Bureau of the Census	U.S. Office of Education	Carnegie Commission	Cartter-Farrell	Commission on Human Resources	Office of Program Planning and Evaluation	Butz-Jordan, Rand
Strategy	Trend extrapolation	Trend extrapolation	Trend extrapolation Policy alternatives	Trend extrapolation	Trend extrapolation	Trend extrapolation Policy alternatives	Trend extrapolation Policy alternatives
Purpose	Demographic projection for U.S. (long-term)	Education data for general planning (short-term)	Background support for recommendations (long-term)	Future faculty manpower needs (long-term)	Future professional manpower supply (short-term)	Potential demands and student aid needs (short-term)	Future structure and resource requirements (long-term)
Underlying Assumptions	1) Increasing high school graduation and continuation-to-college rate 2) Constant 1969 school-level distribution 3) Unchanging cohort enrollment pattern	1) Continuation of all '61-'71 trends 2) 18-21 cohort is valid predictor of enrollments 3) Validity of 20-year span for projection (10-year base for 10-year projection)	A-Policy 1) Continuation of past population patterns and enrollement-ratio trends 2) Adequate funding and increasing high school graduation rate and per capita income B-Policy Incorporates policies which inflate or deflate enrollments (e.g., adult education and shortened degrees) III-Recommendations Recommendations from *Toward A Learning Society*, 1973.	1) Continuation of past growth trends 2) Increasing percentage of enrollments at 2-year colleges 3) Increasing continuation ratio to graduate school	1) Continuation of past enrollment ratio growth trends (some variations) 2) Increasing women's enrollment rate 3) Increasing continuation ratio to graduate school	1) Increasing enrollment rate from lower income and achievement levels 2) Some increasing persistence rates 3) Validity of Project Talent attrition rates 4) Attendance rate equalization, between income/ability quartiles 5) Adequate financial aid	1) Increasing adult education and use of educational technology 2) Organizational changes, e.g., 2-year baccalaureate institutions 3) Extended campus programs
Date Published	January 1972	1972	October 1971, and in 1973	1965	1970	1970	February 1972
Projection Period	1975-2000	1972-1981	1970-2000	1965-2000	1966-1975	1968-1977	1970-2000
Frequency	Occasional	Annual	Single Studies	Single study	Single study	Single study	Single study
Driving Factors	14-34 population projection and enrollment rates by sex	1) 18-21 population projection (series D), 2) 18-21 enrollment ratio by sex	1) 18-21 population projection (series D), 2) 18-21 enrollment ratios, 3) Commission recommendations	1) 18-21 population projection (series B), 2) 18-21 enrollment ratios, 3) Continuation ratios	17-35+ population projection and enrollment ratios by sex (full-time and part-time)	1) Projection of high school graduates, 2) Project Talent data	1) Population projections (series B and E), 2) 18-24 enrollment ratios phase adjustments
Multiple Projections	Yes (parameter changes)	No	Yes (policy/recommendation alternatives)	Yes (parameter changes)	No	Yes (policy alternatives)	Yes (parameter changes)
Projected Categories	1) Total degree-credit 2) Male-female 3) Age groups (14-34)	1) Total enrollment 2) Degree/nondegree 3) Undergrad/graduate 4) Male/female 5) 2 year/4 year 6) Full-time/part-time 7) Public/private 8) FTE 9) First-time 10) Other	1) Total degree credit 2) Undergrad/graduate 3) Policy increments 4) 13 institutional types	1) Total degree credit 2) Undergrad/graduate 3) 2 year/4 year 4) Other	1) Total degree credit 2) Undergrad/graduate 3) Male/female 4) Full-time/part-time 5) First-time 6) Advanced professional 7) Age groups	1) Total degree credit 2) Undergrad/graduate 3) FTE 4) Income/ability quartile	1) Total degree credit 2) Other

The Future of Enrollment Projection

After examining the strategies, purposes, and assumptions of existing studies and reflecting on various planning needs, the educational planner is confronted with two general realizations. First, the inherent weaknesses and limited ability of current enrollment projections require that they be scrutinized closely when applied to the current volatile scene. Second, existing approaches to enrollment forecasting are inadequate, and new approaches must be developed. These new approaches must focus on underlying socio-economic factors. Then projection methodology can be applied to measures that validly represent the factors and relationships which are influencing enrollments in the present and the foreseeable future. In regard to the development of future projection studies, the following items should be considered.

- The definition of data elements in projections studies involves significant educational decisions because they begin to shape our conception of what constitutes participation in postsecondary education. Therefore, special care should be given to date element conceptualization. Furthermore, these decisions lead to numerical outputs which can contribute significantly to the psychological "mood" in postsecondary education.
- Future enrollment studies must grapple with the evolving redefinition of what constitutes an enrollment in postsecondary education and how it is measured. Full-time, continuous, resident enrollment is no longer the only significant pattern of participation. Analysts must search for the new patterns and determine accurate measures of participation in the postsecondary system.
- The underlying social factors, such as changing attitudes and fluctuating economic and demographic conditions, must be built into projection models. These factors are the forces which foster different volumes of enrollment, change styles of participation, and vary the persistence of students through the system. Tough conceptual issues exist first in identifying these social factors and then relating them to one another.

Future enrollment studies face more specific problems as well. Projection studies in the growth period of the sixties focues on inputs to the educational system. Now, we need additional studies identifying the movements of students through the system. Also, studies projecting system outputs are crucially important as inputs to the occupational structure and as an ingredient in the analysis of system effectiveness and efficiency.

Especially at the national level, projection studies need to solve the problems of comparability and information lag. Definitions of enrollment vary widely among institutions, sometimes causing analysts to rely on the least common denominator, such as full-time, degree-credit enrollment, as the driving factor in their extrapolations. We need to acknowledge the diversity of enrollments, to agree on some common measures for participation, and to specify the limits of comparability.

Information lag is caused by the mammoth task of aggregating national data, the desire of the National Center for Educational Statistics for "complete" information, and slow compliance of some institutions. These lags adversely affect both measurement and projection. Sampling techniques might be a remedy for this situation.

New techniques and methodologies are surfacing at the national, state and institutional levels as old approaches are found unsatisfactory. Ways of sharing new ideas should be found so that all those interested in projection analysis can benefit from new and proven approaches. In this way the diverse needs of planners can better be met.

—Wayne L. Mangelson, Donald M. Norris, Nick L. Poulton, John A. Seeley

BIBLIOGRAPHY

Projection Studies

(1) Butz, W. P., and Jordan, P. L. *Population Growth and Resource Requirements for U.S. Education,* Santa Monica, California: RAND, R-1033-CPG, February, 1972.

(2a) Carnegie Commission on Higher Education. *New Students and New Places,* New York: McGraw-Hill, October, 1971.

(2b) ————. *Priorities for Action: Final Report of the Carnegie Commission on Higher Education,* New York: McGraw-Hill, 1973. (Technical Note A)

(3) Cartter, Allan M., and Farrell, R. "Higher Education in the Last Third of the Century," *Educational Record,* Vol. 46, No. 2, Spring, 1965, pp. 119-128.

(4) Folger, J. K., *et al. Human Resources and Higher Education,* New York: Russell Sage, 1970. (Commission on Human Resources)

(5) Froomkin, Joseph. *Aspirations, Enrollments and Resources,* Washington, D.C.: U.S. Government Printing Office, (OE) 50058. (OPPE Model)

(6) Marien, Michael. *Beyond the Carnegie Commission,* Syracuse, New York: EPRC/Syracuse University Research Corporation, August, 1972.

(7) Moses, Stanley. "The 'New' Domain of Post-secondary Education", *Notes on the Future of Education,* Vol. 11, No. 3, Summer, 1971, pp. 2-5.

(8) U.S. Bureau of the Census. *Projections of School and College Enrollment: 1971 to 2000.* Washington, D.C.: U.S. Government Printing Office, Series P-25, No. 473, January, 1972.

(9a) U.S. Office of Education. *Projections of Educational Statistics to 1980-81,* Washington, D.C.: U.S. Government Printing Office, (OE) 72-99, 1972.

(9b) ————. *Projections of Educational Statistics to 1981-82,* Washington, D.C.: U.S. Government Printing Office, (OE) 73-11105, 1972.

Other References Which Contain Extensive Bibliographies

(10) Mangelson, Wayne L.; Norris, Donald M.; Poulton, Nick L.; and Seeley, John A., "Projecting College and University Enrollments: Analyzing the Past and Focusing the Future", Ann Arbor: Center for the Study of Higher Education, 1974.

(11) Peterson, Marvin W. "The Postsecondary Education Enrollment System: An Analytic Framework." Paper presented at the NCHEMS National Invitational Seminar on Postsecondary Education Issues: Visible Questions—Invisible Answers, Washington, D.C., May 16-17, 1974. Proceedings in press.